



Huntington Power Plant

6 miles west of Huntington, Utah on Hwy. 31
P.O. Box 680
Huntington, Utah 84528

February 26, 2018

Mr. Bryce Bird, Director
Utah Department of Environmental Quality
Division of Air Quality
195 North 1950 West
P.O. Box 144820
Salt Lake City, UT 84114-4820

**RE: 1st Quarter, 2018 Particulate Matter Compliance Test Report - 40 CFR 63 SubPart UUUUU,
Huntington Power Plant Unit 1 and Unit 2 (Title V Permit #1501001004)**

Dear Mr. Bird,

In accordance with Title V Permit Condition II.B.3.f.1(b) and 40 CFR §63.10021(d) the Huntington Power Plant submits the 1st Quarter 2018 Particulate Matter (PM) Compliance Test Reports for Unit 1 and for Unit 2.

This submittal is intended to satisfy the report submittals for both units, and includes the portable document format (PDF) report that is submitted electronically via the Emissions Collection and Monitoring Plan System (ECMPS).

The summary results of the 1st Quarter 2018 PM test results are:

Unit	Emission rate (lb/mmBtu)
1	0.004
2	0.005

I am authorized to make this submission on behalf of the owners and operators of the affected source or affected units for which the submission is made. I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information, or omitting statements and information, including the possibility of fine or imprisonment.

Should you have any questions regarding this information, please contact Richard Neilson, Huntington Power Plant Environmental Engineer at (435) 687-4334 or me at (435) 687-4211.

Sincerely,

Darrell Cunningham
Managing Director and Responsible Official, Huntington Plant

Enclosures: "Source Test Report 1st Quarter 2018 Particulate Matter Testing – Huntington Unit 1"
"Source Test Report 1st Quarter 2018 Particulate Matter Testing – Huntington Unit 2"

cc: David Barnhisel
Steve Jensen
Sara Loiacono, USEPA Region VIII, w/enclosures, by electronic communication

SOURCE TEST REPORT
1st Quarter 2018 Particulate Matter Testing
PacifiCorp
Huntington Power Plant Unit 2
Huntington, Utah

Prepared For:

PacifiCorp
Highway 31
Huntington, Utah 84528

For Submittal To:

Utah Division of Air Quality
195 N 1950 W
Salt Lake City, Utah 84114

Prepared By:

Montrose Air Quality Services, LLC
990 W. 43rd Avenue
Denver, Colorado 80211

Document Number: **043AS-341317-PP-19**
Submittal Date: **February 15, 2018**



Executive Summary

Montrose was contracted by PacifiCorp to conduct compliance testing at the Huntington Power Plant near Huntington, Utah. Testing was performed to determine emission rates of particulate matter (PM) from the exhaust stack of Huntington Unit 2. Compliance test results are summarized in the table below; detailed test results are given in the following report.

PacifiCorp Huntington Power Plant PM Compliance Test Results Summary						
Source	Parameter	Date	Average Value	Emission Limit		
Huntington Unit 2	Filterable Particulate Matter	2/7/2018	0.005	0.030 lb/mmBtu		
			0.05	0.30 lb/MW-hr		
Each result is the average of three two-hour test runs.						
Abbreviations: lb/mmBtu: pounds per million British thermal units lb/MW-hr: pounds per megawatt hour						

Introduction

Montrose Air Quality Services (Montrose) was contracted by PacifiCorp to conduct source testing services at the Huntington Power Plant near Huntington, Utah. The Huntington Plant comprises two pulverized coal-fired boilers. Huntington Unit #2 is equipped with low-NO_x burners and overfire air for NO_x control, an FGD scrubber for SO₂ control and pulse-jet fabric filters for PM control. Testing was conducted in accordance with the requirements of 40 CFR Part 63 Subpart UUUUU, National Emission Standards for Hazardous Air Pollutants (NESHAP): Coal- and Oil-Fired Electric Utility Steam Generating Units.

Contact information for the project is listed in the table below.

Contact	Affiliation	Telephone	E-mail
Frank Zampedri Environmental Analyst	PacifiCorp	(801) 220-2169	frank.zampedri@pacificorp.com
Richard Neilson Environmental Engineer		(435) 687-4334	richard.neilson@pacificorp.com
Rob Leishman Environmental Scientist	UDEQ	(801) 536-4063	rleishman@utah.gov
Scott Bouchard Field Project Manager	Montrose	(303) 495-3936	sbouchard@montrose-env.com

Scope of Work

Testing was performed to determine concentrations and mass emission rates of particulate matter (PM) for comparison to the applicable emission limits listed in the table below.

Source	Regulation	Parameter	Emission Limit
Huntington Unit 2	NESHAP UUUUU	PM (lb/mmBtu)	0.030 lb/mmBtu
		PM (lb/MW-hr)	0.30 lb/MW-hr
<u>Abbreviations:</u> lb/mmBtu: pounds per million British thermal units lb/MW-hr: pounds per megawatt-hour			

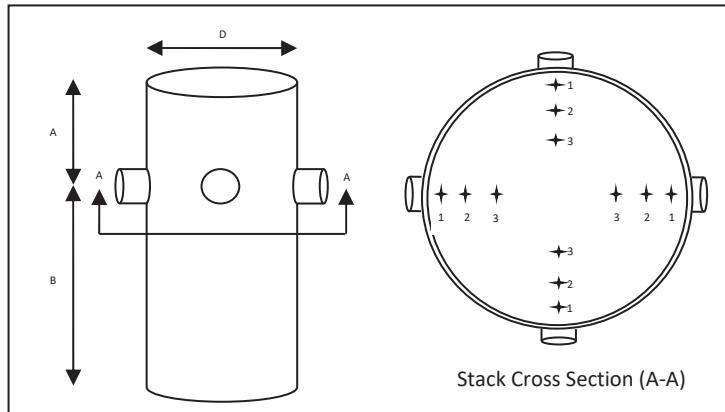
Testing Methods

Montrose used the following EPA Reference Methods for the testing program. No deviations from the Reference Methods were noted.

Parameter	EPA Methods	Reference	Test Runs/Duration	Target Volume	Sample
PM (lb/mmBtu)	1, 2, 3B, 4, 5*, 19		3 @ 2 hr	2 dscm (70.63 dscf)**	
*In accordance with Table 5 of NESHAP Subpart UUUUU, the front-half temperature was set at 320° ± 25°F.					
**Sample volume from Table 2 of NESHAP Subpart UUUUU, doubled in accordance with §63.10005.					

Testing Location

The Huntington Unit 2 exhaust sampling location consists of a vertical, circular stack with four orthogonal sampling ports located at least six diameters downstream and two diameters upstream of the nearest flow disturbances. PM testing was performed across a grid of 12 points determined using EPA Method 1. See the schematic below.



Huntington Test Diagram	
Unit #	2
Diameter (D)	322.7"
Upstream Distance (A)	>220'
Downstream Distance (B)	>266'
Sample Point Distances from Stack Wall	
Traverse Point 1	14.1"
Traverse Point 2	47.3"
Traverse Point 3	95.5"

Test Results

The results of the testing program are given in the tables below. Detailed test results are located in Appendix A, along with sample calculations for all computed values.

Pacificorp Huntington Unit 2 PM Compliance Test Results Summary (2/7/2018)						
Parameter	Run #1	Run #2	Run #3	Average	QA Specification	Emission Limit***
Start Time	7:00	9:38	12:43	—	—	—
Stop Time	9:07	11:44	14:53	—	—	—
Sample Gas Volume (dscf)	75.09	75.13	73.57	74.60	>70.63*	—
Isokinetic Variation (%)	98.2	98.0	97.4	97.9	100 ± 10%	—
Filterable PM (lb/mmBtu)	0.003	0.007	0.004	0.005	—	0.030
Boiler Load (MW)	472	471	471	471	>459**	—
Filterable PM (lb/MW-hr)	0.03	0.07	0.05	0.05	—	0.30

* Sample volume from Table 2 of NESHAP Subpart UUUUUU, doubled in accordance with §63.10005.
**90% of design capacity, in accordance with §63.10007(a)(2).
***As shown, average PM emissions were less than 50% of the applicable emission limit, qualifying the unit for Low Emitting EGU (LEE) status.

Testing Equipment

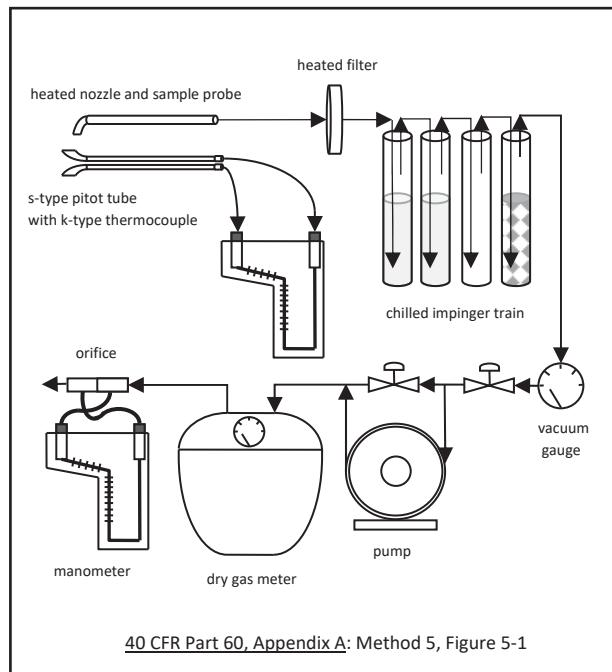
All testing equipment was housed in a climate-controlled mobile analytical laboratory designed and built by Montrose. All required quality assurance tests were performed as required by the applicable Reference Methods. Detailed equipment descriptions are given in the table below.

Parameter	Equipment	EPA Reference Method(s)
Particulate Matter (PM)	Heated probe with glass nozzle and stainless steel probe liner Quartz fiber filter S-type pitot tube K-type thermocouple Inclined-vertical manometer Dry gas meter Digital scale Analytical balance	1, 2, 3B, 4, 5, 19

Test Details

Particulate matter testing was performed using EPA Methods 1, 2, 3B, 4 and 5. Each test run was 120 minutes in duration. Sampling was performed along a grid of points determined using EPA Method 1. Exhaust gas flow measurements were taken using an S-type pitot tube, K-type thermocouple and inclined-vertical manometer in accordance with EPA Method 2. A sample of exhaust gas was withdrawn from the stack at an isokinetic flow rate through a heated stainless steel nozzle and probe, through a heated quartz-fiber filter, through four chilled glass impingers containing known masses of water or silica gel, and through a dry gas meter. (See Figure 5-1 at right.) The default dry molecular weight for combustion sources (30 lbs/lb-mole) listed in EPA Method 3 was combined with pressure and temperature measurements to calculate stack gas velocity in accordance with EPA Method 2. Stack gas moisture concentrations were determined gravimetrically in accordance with EPA Method 4.

Following each sampling period, the filter and rinses of the nozzle and probe were recovered and returned to Montrose's laboratory for gravimetric analysis. Following analysis, the particulate mass captured during each test run was combined with concurrent flow and moisture data to calculate particulate matter emissions in units of pounds per hour (lb/hr). The particulate mass captured during each test run was combined with concurrent CO₂ concentration data from the plant CEMS¹ and the appropriate fuel F-factor from EPA Method 19 (1,800 scf/mmBtu) to calculate PM emissions in units of pounds per million British thermal units (lb/mmBtu) for comparison to the applicable emission limit.



¹ EPA Method 3B §6.0 states "As an alternative to the sampling apparatus and systems described herein, other sampling systems may be used, provided such systems are ... capable of yielding acceptable results." As NESHAP UUUUUU requires certified Part 75 CEMS CO₂ data to calculate SO₂ and mercury emissions in units of lb/mmBtu, CEMS CO₂ data are considered acceptable for PM emission calculations as well.

Appended Information

Supporting data for this testing program are included as follows.

Appendix A: Test Summary

- Data Reduction Spreadsheet
- Sample Calculations

Appendix B: Field Data

- Field Datasheets

Appendix C: Laboratory Data

- Gravimetric Analysis

Appendix D: CEMS Data

- Test Run CEMS Printouts

Appendix E: Calibration Information

- Dry Gas Meter Pre-Test and Post-Test Calibrations
- Critical Orifice Calibration Certificate
- STAC Certification



Appendix A: Test Summary

Data Reduction Spreadsheets

Sample Calculations

043AS-341317
 PacifiCorp
 Huntington Unit 2
 2/7/2018

Θ	Run #	1	2	3
	Start Time	7:00	9:38	12:43
	Stop Time	9:07	11:44	14:53
	Sample Time (min.)	120	120	120

EPA Method 2 Data		1	2	3	Average
Inputs					
D _s	Stack Diameter (inches)	322.7	322.7	322.7	322.7
P _{bar}	Barometric Pressure ("Hg)	23.77	23.77	23.77	23.8
P _g	Stack Static Pressure ("H ₂ O)	-3.2	-3.2	-3.2	-3.2
C _p	Pitot Tube Coefficient (unitless)	0.84	0.84	0.84	0.84
Δp _{avg}	Avg. Velocity Head of Stack Gas V("H ₂ O)	0.8361	0.8439	0.831	0.8370
T _s	Stack Gas Temperature (°F)	109	111	111	110
Calculations					
A	Stack Area (ft ²)	567.970	567.970	567.970	567.970
P _g	Stack Static Pressure ("Hg)	-0.24	-0.24	-0.24	-0.24
M _d	Stack Gas Molecular Weight, dry basis (lb/lb-mole)	30.00	30.00	30.00	30.00
M _s	Stack Gas Molecular Weight, wet basis (lb/lb-mole)	28.71	28.64	28.64	28.67
P _s	Absolute Stack Pressure ("Hg)	23.53	23.53	23.53	23.53
T _{s(abs)}	Absolute Stack Gas Temperature (°R)	569	571	571	570
V _s	Stack Gas Velocity (ft/sec)	55.1	55.8	54.9	55.3
Q	Stack Gas Dry Volumetric Flow Rate (dscf/hr)	73,412,188	73,536,835	72,451,982	73,133,668
Q	Stack Gas Dry Volumetric Flow Rate (dscf/min)	1,223,536	1,225,614	1,207,533	1,218,894

CEMS Diluent Data		1	2	3	Average
CO ₂ (%vw)		11.0	10.9	10.9	10.9
CO ₂ (%vd)		12.3	12.3	12.3	12.3

EPA Method 4 Data		1	2	3	Average
Inputs					
V _{lc}	Volume of Water Condensed (mL)	198.8	218.1	199.1	205.3
V _m	Volume of Stack Gas Collected (dscf)	92.24	92.973	91.77	92.328
Y	Meter Calibration Factor (unitless)	0.9988	0.9988	0.9988	0.9988
ΔH	Pressure Differential Across Orifice ("H ₂ O)	1.6	1.7	1.6	1.6
T _m	Temperature at Gas Meter (°F)	57	61	65	61
Calculations					
P _m	Absolute Pressure at Gas Meter ("Hg)	23.89	23.90	23.89	23.89
T _m	Absolute Temperature at Gas Meter (°R)	517	521	525	521.0
V _{wc(std)}	Volume of Water Condensed (scf)	9.36	10.26	9.37	9.66
V _{m(std)}	Sample Gas Volume (dscf)	75.09	75.13	73.57	74.60
B _{ws act}	Observed Stack Gas Moisture Content (%/100)	0.111	0.120	0.113	0.115
B _{ws sat}	Saturated Moisture Content (%/100)	0.107	0.114	0.114	0.111
B _{ws}	Moisture Content Used (%/100)	0.107	0.114	0.113	0.111

EPA Method 5 Data		1	2	3	Average
Inputs					
D _n	Nozzle diameter (")	0.233	0.233	0.233	0.233
C ₁	Mass of PM collected on filter (mg)	6.5	6.9	6.2	6.5
C ₂	Mass of PM collected in rinses (mg)	0.9	8.4	4.0	4.4
Emission Calculations					
F _c	Fuel F-Factor (scf/mmBtu)	1800	1800	1800	1800
A _n	Cross-sectional area of nozzle (ft ²)	2.96E-04	2.96E-04	2.96E-04	2.96E-04
I	Isokinetic variation (%)	98.2	98.0	97.4	97.9
m _n	Total Filterable PM mass less blank (mg)	7.4	15.3	10.2	11.0
C _s	Filterable Particulate concentration (gr/dscf)	0.002	0.003	0.002	0.002
C _s	Filterable Particulate concentration (lb/dscf)	2.17E-07	4.49E-07	3.06E-07	3.24E-07
E _{lb/hr}	Filterable Particulate mass emission rate (lb/hr)	16	33	22	24
	Boiler Load (MW)	472	471	471	471
	Filterable Particulate mass emission rate (lb/MW-hr)	0.03	0.07	0.05	0.05
F _c	Filterable Particulate mass emission rate (lb/mmBtu)	0.003	0.007	0.004	0.005
8760 hrs/yr	Filterable Particulate mass emission rate (tons/year)	70	145	97	104

EPA Method 5: Determination of Particulate Matter Emissions (40 CFR Part 60, Appendix A-1)

Variables

Variable	Value	Definition	Unit of Measurement
D _s	322.7	Stack Diameter	inches
A	567.97	Cross-Sectional Area of the Stack	ft ²
P _g	-3.20	Stack Static Pressure	in. H ₂ O
P _g	-0.24	Stack Static Pressure	in. Hg
%CO ₂	12.3	Concentration of Carbon Dioxide	Dry Volume Percent (%vd)
%O ₂	n/a	Concentration of Oxygen	Dry Volume Percent (%vd)
M _d	30.00	Dry Molecular Weight of the Stack Gas (default)	lb/lb-mole
P _{bar}	23.77	Barometric Pressure	in. Hg
ΔH	1.60	Pressure Differential across Orifice	in. H ₂ O
P _m	23.89	Absolute Pressure at Gas Meter	in.Hg
t _m	57	Temperature at Gas Meter	°F
T _m	517	Absolute Temperature at Gas Meter	°R
K1	0.04706	Conversion Factor	ft ³ /mL
V _{lc}	198.8	Volume of Water Condensed	g
V _{wc(std)}	9.36	Volume of Water Condensed	scf
K ₄	17.64	Constant	°R/in.Hg
Y	0.9988	Meter Calibration Factor	Unitless
V _m	92.24	Volume of Stack Gas Collected	dcf
V _{m(std)}	75.090	Sample Gas Volume	dsfc
B _{ws}	0.107	Stack Gas Moisture Content	%/100
M _s	28.71	Actual Molecular Weight of the Stack Gas	lb/lb-mole
P _s	23.53	Absolute Stack Pressure	in. Hg
T _s	109	Average Stack Temperature	°F
T _{s(abs)}	569	Average Absolute Stack Temperature	°R
K _p	85.49	Conversion Factor	(ft/sec) x V(((lb/lb-mole)(in.Hg))/((°R)(in.H ₂ O)))
C _p	0.84	Pitot Coefficient	Dimensionless
AvgvΔp	0.8361	Average Square Root of Velocity Head Readings	in. H ₂ O
V _s	55.09	Average Stack Gas Velocity	ft/sec
T _{std}	528	Standard Absolute Temperature	°R
P _{std}	29.92	Standard Absolute Pressure	in. Hg
Q	73,412,188	Dry Volumetric Flow Rate Corrected to Standard Conditions	dsfc/hr
D _n	0.233	Nozzle Diameter	inches
A _n	2.96E-04	Cross-Sectional Area of the Nozzle	ft ²
m _n	7.40	Total PM Mass	mg
C _s	2.17E-07	Particulate Concentration	lb/dsfc
E _{lb/hr}	15.9	PM Mass Emission Rate	pounds per hour
F _c	1800	F-Factor from EPA Method 19	scf/mmBtu
E _{lb/mmBtu}	0.003	PM Mass Emission Rate	pounds per million Btu
E _{tons/yr}	69.9	PM Mass Emission Rate	tons per year
K5	0.0945	Constant	(in.Hg · min) / ((°R · sec)
Θ	120	Sample Time	minutes
I	98.2 %	Isokinetic variation	percent

EPA Method 5: Determination of Particulate Matter Emissions (40 CFR Part 60, Appendix A-1)

$$A = \pi(D_s/24)^2$$

$$\pi(322.7/24)^2$$

$$= 567.97 \text{ ft}^2$$

$$P_g = P_{bar}/13.6$$

$$= -3.2/13.6$$

$$= -0.24 \text{ in. Hg}$$

$$M_d = 30.00 \text{ lb/lb-mole}$$

$$P_m = P_{bar} + (\Delta H/13.6)$$

$$= 23.77 + (1.6/13.6)$$

$$= 23.89 \text{ in. Hg}$$

$$T_m = 460 + t_m$$

$$= 460 + 57$$

$$= 517 \text{ R}$$

$$V_{wc(std)} = K_1 \times V_{lc}$$

$$= 0.04706 \times 198.8$$

$$= 9.36 \text{ scf} \quad (Eq. 4-1)$$

$$V_{m(std)} = \frac{K_4 \times Y \times V_m \times P_m}{T_m}$$

$$= \frac{17.64 \times 0.9988 \times 92.24 \times 23.89}{517}$$

$$= 75.09 \text{ dscf} \quad (Eq. 4-3)$$

$$B_{ws} = \frac{V_{wc(std)}}{V_{wc(std)} + V_{m(std)}}$$

$$= \frac{9.36}{9.36 + 75.09}$$

= 0.111 (%/100) (Eq. 4-4) [Observed value above saturation; calculated saturation value used for subsequent calculations.]

$$M_s = M_d \times (1 - B_{ws}) + (18.0 \times B_{ws})$$

$$= 30.00 \times (1 - 0.107) + (18.0 \times 0.107)$$

$$= 28.71 \text{ lb/lb-mole} \quad (Eq. 2-6)$$

$$P_s = P_{bar} + P_g$$

$$= 23.77 + (-0.24)$$

$$= 23.53 \text{ in. Hg}$$

$$T_{s(abs)} = 460 + T_s$$

$$= 460 + 109$$

$$= 569 \text{ R}$$

EPA Method 5: Determination of Particulate Matter Emissions (40 CFR Part 60, Appendix A-1)

$$V_s = K_p \times C_p \times Avgv/\Delta p \times \sqrt{\frac{T_{s(abs)}}{(P_s \times M_s)}}$$

$$= 85.49 \times 0.84 \times 0.8361 \times \sqrt{\frac{569}{(23.53 \times 28.71)}}$$

$$= 55.1 \text{ ft/sec}$$

(Eq. 2-7)

$$Q = 3600 \times (1 - B_{ws}) \times (V_s) \times (A) \times \frac{(T_{std} \times P_s)}{(T_{s(abs)} \times P_{std})}$$

$$= 3600 \times (1 - 0.107) \times (55.09) \times (567.97) \times \frac{(528 \times 23.53)}{(569 \times 29.92)}$$

$$= 73,412,188 \text{ dscf/hr}$$

(Eq. 2-8)

$$A_n = \pi(D_n/24)^2$$

$$\pi(0.233/24)^2$$

$$= 2.96E-04 \text{ ft}^2$$

$$C_s = \frac{m_n}{(mg/g)(g/lb)(V_{m(std)})}$$

$$= \frac{7.4}{(1000)(453.592)(75.090)}$$

$$= 2.17E-07 \text{ lb/dscf}$$

$$E_{lb/hr} = C_s \times Q$$

$$= 2.17E-07 \times 73412188$$

$$= 15.9 \text{ lb/hr}$$

$$E_{lb/mmBtu} = \frac{C_s \times F_c \times 100}{(CO_2\%vd)}$$

$$= \frac{2.17E-07 \times 1800 \times 100}{(12.3)}$$

$$= 0.003 \text{ lb/mmBtu}$$

$$E_{tons/yr} = \frac{E_{lb/hr} \times (\text{Hrs/yr})}{(\text{lbs/ton})}$$

$$= \frac{15.95 \times 8,760}{2000}$$

$$= 69.9 \text{ tons/year}$$

$$I = \frac{K5 \times T_{s(abs)} \times V_{m(std)} \times 100}{P_{s(abs)} \times V_s \times A_n \times \Theta \times (1 - B_{ws})}$$

$$= \frac{0.0945 \times 569 \times 75.090 \times 100}{23.53 \times 55.09 \times 3.0E-04 \times 120 \times (1 - 0.107)}$$

$$= 98.2 \%$$

(Eq. 5-7)



Appendix B: Field Data

Field Datasheets

Emissions Measurement Company: Method 5/202 Data Sheet

EMCo Job #:	043AS-341317	Operator(s):	CW
Client:	Pacificorp	Barometric pressure ("Hg):	23.77
Source:	HNTC 2	Static pressure ("H ₂ O):	-3.2
Date:	2/7/18	Leak Check ("H ₂ O @ Vac):	0.00 @ 13"
Run #	1	Leak Check ("H ₂ O @ Vac):	0.00 @ 14"
Meterbox ID:	M5-2	Pitot ID / Coeff:	.84 ✓
Meterbox Y =	9488 ΔH@= 1.772	Pitot Leak Check:	✓
O ₂ %:	8.0	Nozzle Diameter:	.233
CO ₂ %:	11.7	K Factor:	2.3
Start Time	0700	Stop Time	0907

Impinger Weights (x.x g)	Initial	Final
Impinger 1		
Impinger 2		
Impinger 3		
Impinger 4 (SG)		
Total		
	Total	

064.370

Traverse Point	Sample Time	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Velocity Δp ("H ₂ O)	Orifice Pressure ΔH ("H ₂ O)	Vacuum ("Hg)	Sample Volume (ft ³)	DGM Temp (°F) Inlet	CPM Filter Temp (°F) Outlet	Imp. Outlet Temp (°F)
1 1	10	108	314	319	.55	1.3	8	071.2	49	48	67
2 20	108	317	320	320	.72	1.7	10	079.1	53	50	69
3 30	109	317	321	322	.79	1.8	11	087.2	57	51	69
2 1	40	109	317	320	.59	1.4	9	094.4	58	52	70
2 50	107	316	320	320	.70	1.6	10	102.0	60	53	71
3 60	110	316	320	320	.79	1.8	12	110.1	61	54	72
3 1	70	110	316	319	.60	1.4	9	117.2	60	55	72
2 80	110	317	320	320	.72	1.7	11	125.2	62	56	71
3 90	110	320	320	320	.80	1.8	11	133.2	62	56	70
4 1	100	108	318	320	.64	1.5	9	141.3	63	57	69
2 110	108	318	320	320	.74	1.7	10	148.5	63	58	68
3 120	108	319	320	320	.78	1.8	11	156.6	64	58	67
12	120	109	314	319	83.61	1.6	12	092.240	52	70	54
Total	Total	Average	Minimum	Minimum	Avg Δp	Average	Max.	Total	Average	Average	Maximum

Emissions Measurement Company: Method 5/202 Data Sheet

EMCo Job #:	043AS-341317	Operator(s):	CW
Client:	Pacificorp	Barometric pressure ("Hg):	23.77
Source:	HNTG 2	Static pressure ("H ₂ O):	-3.2
Date:	2/7/18	Leak Check ("H ₂ O @ Vac):	0.00 @ 14"
Run #	2	Leak Check ("H ₂ O @ Vac):	0.00 @ 16"
Meterbox ID:	M5-2	Pitot ID / Coeff:	.84 ✓
Meterbox Y = .9988	ΔH@ = 1.772	Pitot Leak Check:	✓
O ₂ %:	8.0	Nozzle Diameter:	.233
CO ₂ %:	11.7	K Factor:	2.3
Start Time	0938	Stop Time	1144

Impinger Weights (x.x g)	Initial	Final
Impinger 1		
Impinger 2		
Impinger 3		
Impinger 4 (SG)		
Total		
		Total

156.880

Traverse Point	Sample Time	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Velocity Δp ("H ₂ O)	Orifice Pressure ΔH ("H ₂ O)	Vacuum ("Hg)	DGM Temp (°F)		CPM Filter Temp (°F)	Imp. Outlet Temp (°F)	
								Inlet	Outlet			
(1) 1	10	108	313	321	.59	1.4	9	164.1	58	57	67	49
2	20	111	317	318	.75	1.7	11	171.9	62	58	67	45
3	30	111	320	319	.78	1.8	12	179.9	64	58	68	46
								187.2				
(2) 1	40	111	317	321	.62	1.4	9	+79.9	64	58	68	46
2	50	111	319	321	.74	1.7	11	195.1	64	58	68	47
3	60	111	318	320	.79	1.8	12	203.1	64	58	69	50
(3) 1	70	110	317	320	.60	1.4	9	210.5	63	59	70	54
2	80	111	320	320	.77	1.8	11	218.5	64	59	70	51
3	90	111	312	320	.81	1.9	12	226.8	65	59	71	46
(4) 1	100	111	321	320	.57	1.3	9	233.8	64	60	72	45
2	110	111	319	320	.78	1.8	11	241.7	66	60	72	45
3	120	109	320	320	.78	1.8	11	249.853	66	60	73	47
12	120	111	313	318	0.8439	1.7	12	92.973	61	Average	70	54
Total	Total	Average	Minimum	Minimum	Avg Δp	Average	Max.	Total	Total	Average	Average	Maximum

Emissions Measurement Company: Method 5/202 Data Sheet

EMCo Job #: 043AS-341317	Operator(s): CW
Client: Gas	Barometric pressure ("Hg): 23.77
Source: HWTR 2	Static pressure ("H ₂ O): -3.2
Date: 2/7/18	Leak Check ("H ₂ O @ Vac): 0.00 @ 15"
Run #: 3	Leak Check ("H ₂ O @ Vac): 0.00 @ 14"
Meterbox ID: MS-2	Pitot ID / Coeff: .84
Meterbox Y = 9988 ΔH@= 1.772	Pitot Leak Check: ✓
O ₂ %: 8.0	Nozzle Diameter: .233
CO ₂ %: 11.7	K Factor: 2.3
Start Time: 1243	Stop Time: 1453

Impinger Weights (x.x g)	Initial	Final
Impinger 1		
Impinger 2		
Impinger 3		
Impinger 4 (SG)		
Total		

250.098

Traverse Point	Sample Time	Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Velocity Δp (in H ₂ O)	Orifice Pressure ΔH (in H ₂ O)	Vacuum (in Hg)	DGM Temp (°F)		CPM Filter Temp (°F)	Imp. Outlet Temp (°F)	
								Inlet	Outlet			
①	10	111	320	320	.58	1.3	8	257.1	59	58	71	51
	20	111	320	320	.74	1.7	10	265.0	64	59	73	48
	30	111	319	320	.80	1.8	10	273.1	67	60	74	48
②	40	111	318	320	.60	1.4	8	280.4	68	60	74	50
	50	109	318	320	.72	1.7	10	288.2	69	61	75	51
	60	111	318	320	.75	1.7	10	296.2	70	62	76	54
③	70	111	320	321	.58	1.3	8	303.3	68	63	77	52
	80	112	320	320	.74	1.7	10	311.2	69	63	77	53
	90	111	317	321	.80	1.8	11	319.4	70	64	73	54
④	100	109	315	320	.55	1.3	8	326.4	69	64	70	53
	110	108	317	320	.71	1.6	10	333.9	70	65	70	51
	120	112	320	320	.75	1.7	10	341.868	72	66	67	52
12	120	111	317	320	.8310	1.6	10	91.770	65	73	54	
Total	Total	Average	Minimum	Minimum	Avg VΔp	Average	Max.	Total	Average	Average	Average	Maximum

EMCO
EMISSIONS MEASUREMENT COMPANY

EPA Method 5/202 Moisture Datasheet

Job Code 043AS-341317
 Date 2/7/18
 Operator S. BOUCHARD U2

Run # 1 FILTER # 1459 TIN # 4751

Impinger	Tare Weight	Final Weight
Impinger 1	538.0	678.9
Impinger 2	670.2	674.1
Impinger 3	685.3	711.0
Impinger 4	913.1	941.4
Sum	2806.6	3005.4
Total Moisture Gain:	198.8	

Run # 2 FILTER # 1441 TIN # 4754

Impinger	Tare Weight	Final Weight
Impinger 1	489.2	650.0
Impinger 2	443.9	447.9
Impinger 3	707.7	737.3
Impinger 4	924.9	940.6
Sum	2565.7	2783.6
Total Moisture Gain:	218.1	

Run # 3 FILTER # 1442 TIN # 4755

Impinger	Tare Weight	Final Weight
Impinger 1	538.0	659.9
Impinger 2	670.2	676.4
Impinger 3	711.0	755.5
Impinger 4	840.7	888.2
Sum	2780.9	2980.0
Total Moisture Gain:	199.1	



Appendix C: Lab Data

Gravimetric Analysis



EPA Method 5/202 Gravimetric Analysis Report

Project Code:	043AS-341317
Date Finalized:	2/14/2018
Analyst:	Brian Stockham

Laboratory Results Summary	
Sample ID	Filterable Particulate Matter (mg)
Huntington Unit 2, Run #1	7.4
Huntington Unit 2, Run #2	15.3
Huntington Unit 2, Run #3	10.2

No acetone blank corrections were performed.

Analytical Narrative

Quartz fiber filters were dessicated and tared to a constant weight in the MAQS laboratory prior to sampling. Following testing, the filters were dessicated for at least 24 hours, then weighed to a constant weight (± 0.5 mg). The acetone rinses were measured to the nearest milliliter, transferred to tared aluminum weighing dishes, taken to dryness under a fume hood, dessicated for at least 24 hours, then weighed to a constant weight (± 0.5 mg). Each result above represents total filterable particulate matter for each test run (acetone rinse + filter catch), with no blank correction performed unless otherwise indicated.

Instrumentation

All measurements were taken using a Torbal Model AGCN200 Analytical Balance under laboratory conditions. The instrument is auto-calibrated and challenged with three NIST-traceable reference weights daily.

Detection Limit / Sensitivity

All measurements are recorded to 0.0001g (0.1mg).

Notes

No deviations from the analytical procedures from EPA Method 5 were noted. All samples were received in good condition. After analysis, all samples are archived for a period of one year.

Attachments

Gravimetric Analysis Logs

Sample Chain of Custody



EPA Method 5 Gravimetric Analysis Log

Project Code: 043AS-341317
Unit ID: Huntington Unit 2

Front-Half Particulate Matter Filter Catch

Filter #	Run #1		Run #2		Run #3	
	Date	Weight (g)	Date	Weight (g)	Date	Weight (g)
Final Weight #1 (g)	2/12/18	0.385	2/12/18	0.3868	2/12/18	0.3846
Final Weight #2 (g)	2/13/18	0.3854	2/13/18	0.3870	2/13/18	0.3848
Tare Weight #1 (g)	6/29/17	0.3788	6/29/17	0.3799	6/29/17	0.3784
Tare Weight #2 (g)	6/30/17	0.3786	6/30/17	0.38	6/30/17	0.3786
Filter Catch (g)	0.0065		0.0069		0.0062	

Front-Half Particulate Matter Acetone Rinse Catch

Dish #	Run #1		Run #2		Run #3	
	Date	Weight (g)	Date	Weight (g)	Date	Weight (g)
Final Weight #1 (g)	2/12/18	6.4371	2/12/18	6.3959	2/12/18	6.4237
Final Weight #2 (g)	2/13/18	6.4375	2/13/18	6.3963	2/13/18	6.4241
Tare Weight #1 (g)	12/11/17	6.4366	12/11/17	6.3878	12/11/17	6.4201
Tare Weight #2 (g)	1/2/18	6.4362	1/2/18	6.3875	1/2/18	6.4197
Rinse Catch (g)	0.0009		0.0084		0.0040	

Total Particulate Catch

	Run #1	Run #2	Run #3
Filter Catch (g)	0.0065	0.0069	0.0062
+ Rinse Catch (g)	0.0009	0.0084	0.0040
- Acetone Blank (g)	0.0000	0.0000	0.0000
Total PM (g)	0.0074	0.0153	0.0102



Appendix D: CEMS Data

CEMS Printouts for Test Runs

Average Data

Plant: HUNTINGTON PLANT

Interval: 1 Minute

Type: Block

Report Period: 02/07/2018 07:00 Through 02/07/2018 09:07

Time Online Criteria: 1 minute(s)

Source	Parameter (Unit)	UNIT2				
		BARPRESS (INHG)	CO2 (PCT)	OPACITY (PCT)	STKTEMP (DEGF)	UNITLOAD (MMW)
02/07/18	07:00	23.936	11.0	1.3	106.55	469
02/07/18	07:01	23.937	11.1	1.3	106.59	471
02/07/18	07:02	23.937	11.0	1.3	106.80	474
02/07/18	07:03	23.937	11.0	1.4	107.02	476
02/07/18	07:04	23.937	11.0	1.4	107.06	477
02/07/18	07:05	23.937	11.0	1.4	107.68	475
02/07/18	07:06	23.937	10.9	1.4	108.23	472
02/07/18	07:07	23.937	10.8	1.4	108.17	468
02/07/18	07:08	23.937	10.8	1.4	108.72	465
02/07/18	07:09	23.937	10.6	1.4	109.64	464
02/07/18	07:10	23.937	10.6	1.5	109.14	464
02/07/18	07:11	23.936	10.8	1.5	108.09	465
02/07/18	07:12	23.936	10.8	1.6	108.08	467
02/07/18	07:13	23.937	10.7	1.6	108.30	467
02/07/18	07:14	23.938	10.9	1.6	107.97	469
02/07/18	07:15	23.939	10.9	1.5	107.90	470
02/07/18	07:16	23.940	10.8	1.4	108.26	470
02/07/18	07:17	23.940	10.8	1.4	108.60	468
02/07/18	07:18	23.941	10.8	1.4	109.04	467
02/07/18	07:19	23.942	10.6	1.3	108.80	465
02/07/18	07:20	23.942	10.6	1.4	108.71	465
02/07/18	07:21	23.944	10.8	1.3	108.12	465
02/07/18	07:22	23.945	11.0	1.4	107.32	465
02/07/18	07:23	23.945	11.0	1.4	106.91	467
02/07/18	07:24	23.946	11.1	1.4	106.40	470
02/07/18	07:25	23.946	11.3	1.3	106.41	472
02/07/18	07:26	23.946	11.1	1.3	107.16	473
02/07/18	07:27	23.946	11.0	1.3	107.60	472
02/07/18	07:28	23.946	11.0	1.3	107.47	472
02/07/18	07:29	23.946	11.1	1.2	107.28	473
02/07/18	07:30	23.946	11.2	1.3	107.15	473
02/07/18	07:31	23.946	11.1	1.3	107.18	474
02/07/18	07:32	23.946	11.1	1.3	107.62	474
02/07/18	07:33	23.947	11.0	1.3	108.30	472
02/07/18	07:34	23.948	11.0	1.3	108.31	472
02/07/18	07:35	23.949	11.0	1.3	108.39	471
02/07/18	07:36	23.950	10.9	1.3	107.62	470
02/07/18	07:37	23.951	10.9	1.3	104.58	469
02/07/18	07:38	23.952	11.0	1.3	100.69	469
02/07/18	07:39	23.952	11.0	1.3	100.25	468

F = Unit Offline

E = Exceedance

I = Invalid

M = Maintenance

C = Calibration

S = Substituted

T = Out Of Control

Average Data

Plant: HUNTINGTON PLANT

Interval: 1 Minute

Type: Block

Report Period: 02/07/2018 07:00 Through 02/07/2018 09:07

Time Online Criteria: 1 minute(s)

02/07/18	07:40	23.951	10.9	1.3	100.67	467
02/07/18	07:41	23.952	10.9	1.3	101.18	466
02/07/18	07:42	23.952	11.0	1.3	100.99	467
02/07/18	07:43	23.952	11.1	1.3	100.05	468
02/07/18	07:44	23.953	11.1	1.4	99.22	469
02/07/18	07:45	23.953	11.2	1.4	98.56	471
02/07/18	07:46	23.953	11.3	1.4	98.35	473
02/07/18	07:47	23.953	11.3	1.4	98.26	475
02/07/18	07:48	23.952	11.4	1.4	99.01	476
02/07/18	07:49	23.952	11.2	1.4	100.40	477
02/07/18	07:50	23.952	11.1	1.4	104.53	476
02/07/18	07:51	23.952	11.1	1.4	106.29	476
02/07/18	07:52	23.952	11.2	1.4	107.04	476
02/07/18	07:53	23.952	11.1	1.4	107.50	475
02/07/18	07:54	23.952	11.1	1.4	107.95	475
02/07/18	07:55	23.952	11.1	1.4	108.50	474
02/07/18	07:56	23.952	11.0	1.3	108.59	474
02/07/18	07:57	23.952	11.1	1.3	108.64	474
02/07/18	07:58	23.952	11.1	1.3	108.64	473
02/07/18	07:59	23.953	11.1	1.3	108.84	473
02/07/18	08:00	23.953	10.7 I	1.4	108.88	474
02/07/18	08:01	23.954	3.3 I	1.3	108.52	475
02/07/18	08:02	23.955	7.7 I	1.4	108.41	475
02/07/18	08:03	23.955	11.2 I	1.3	108.54	475
02/07/18	08:04	23.956	11.1 I	1.3	108.75	474
02/07/18	08:05	23.956	11.1 I	1.3	109.05	474
02/07/18	08:06	23.956	11.0	1.3	109.41	473
02/07/18	08:07	23.956	11.1	1.3	109.40	473
02/07/18	08:08	23.955	11.2	1.3	108.77	473
02/07/18	08:09	23.956	11.1	1.3	108.81	473
02/07/18	08:10	23.956	11.0	1.3	109.39	473
02/07/18	08:11	23.956	10.9	1.3	109.98	472
02/07/18	08:12	23.957	11.0	1.3	110.28	472
02/07/18	08:13	23.958	11.0	1.3	110.34	471
02/07/18	08:14	23.958	11.0	1.3	110.19	472
02/07/18	08:15	23.958	11.0	1.3	110.07	472
02/07/18	08:16	23.958	11.0	1.3	109.69	474
02/07/18	08:17	23.959	11.1	1.3	109.38	475
02/07/18	08:18	23.959	11.2	1.4	109.43	476
02/07/18	08:19	23.959	11.1	1.4	109.11	476
02/07/18	08:20	23.959	11.1	1.3	109.29	477
02/07/18	08:21	23.960	11.1	1.4	109.80	477
02/07/18	08:22	23.960	11.1	1.4	109.99	476

F = Unit Offline

E = Exceedance

I = Invalid

M = Maintenance

C = Calibration

S = Substituted

T = Out Of Control

Average Data

Plant: HUNTINGTON PLANT

Interval: 1 Minute

Type: Block

Report Period: 02/07/2018 07:00 Through 02/07/2018 09:07

Time Online Criteria: 1 minute(s)

02/07/18	08:23	23.960	11.1	1.4	110.13	475
02/07/18	08:24	23.961	11.0	1.4	110.12	474
02/07/18	08:25	23.961	10.9	1.5	110.40	473
02/07/18	08:26	23.962	10.9	1.4	110.52	474
02/07/18	08:27	23.962	11.1	1.4	110.23	475
02/07/18	08:28	23.962	11.0	1.4	110.27	476
02/07/18	08:29	23.961	11.0	1.5	110.32	477
02/07/18	08:30	23.961	11.1	1.4	110.08	478
02/07/18	08:31	23.961	11.1	1.4	110.09	479
02/07/18	08:32	23.962	10.8	1.4	109.94	479
02/07/18	08:33	23.962	10.9	1.4	110.13	479
02/07/18	08:34	23.962	11.0	1.3	106.82	478
02/07/18	08:35	23.962	11.0	1.4	104.01	476
02/07/18	08:36	23.962	10.8	1.3	103.35	472
02/07/18	08:37	23.962	10.8	1.3	102.95	469
02/07/18	08:38	23.962	10.7	1.3	103.03	468
02/07/18	08:39	23.962	10.9	1.3	103.06	467
02/07/18	08:40	23.962	11.0	1.3	102.80	467
02/07/18	08:41	23.962	10.9	1.3	102.28	468
02/07/18	08:42	23.963	11.0	1.3	101.30	470
02/07/18	08:43	23.963	11.2	1.3	100.28	472
02/07/18	08:44	23.964	11.1	1.3	100.19	473
02/07/18	08:45	23.964	11.0	1.3	100.58	474
02/07/18	08:46	23.964	11.1	1.2	101.42	474
02/07/18	08:47	23.965	11.1	1.2	101.93	473
02/07/18	08:48	23.965	10.9	1.3	102.44	472
02/07/18	08:49	23.965	10.9	1.3	102.51	470
02/07/18	08:50	23.964	11.0	1.3	102.24	470
02/07/18	08:51	23.964	11.0	1.3	102.52	470
02/07/18	08:52	23.964	10.9	1.3	102.27	471
02/07/18	08:53	23.965	11.1	1.3	104.42	472
02/07/18	08:54	23.965	11.1	1.3	107.99	472
02/07/18	08:55	23.965	10.9	1.3	108.55	471
02/07/18	08:56	23.965	10.8	1.3	109.03	470
02/07/18	08:57	23.966	10.8	1.3	109.11	470
02/07/18	08:58	23.966	10.8	1.3	109.43	468
02/07/18	08:59	23.967	10.7	1.4	110.04	468
02/07/18	09:00	23.967	10.7	1.4	110.04	468
02/07/18	09:01	23.967	10.9	1.4	109.47	469
02/07/18	09:02	23.967	11.0	1.4	109.13	471
02/07/18	09:03	23.968	11.0	1.4	109.35	471
02/07/18	09:04	23.968	10.9	1.4	109.98	472
02/07/18	09:05	23.968	10.9	1.4	110.25	471

F = Unit Offline

E = Exceedance

I = Invalid

M = Maintenance

C = Calibration

S = Substituted

T = Out Of Control

Average Data

Plant: HUNTINGTON PLANT

Interval: 1 Minute

Type: Block

Report Period: 02/07/2018 07:00 Through 02/07/2018 09:07

Time Online Criteria: 1 minute(s)

02/07/18	09:06	23.968	10.9	1.5	110.41	471
02/07/18	09:07	23.968	10.8	1.6	110.47	470

Average	23.954	11.0	1.4	106.86	472
Minimum	23.936	10.6	1.2	98.26	464
Maximum	23.968	11.4	1.6	110.52	479
Summation	3,066.123	1,340.0	173.4	13,678.68	60,393
Included Data Points	128	122	128	128	128
Total number of Data Points	128	128	128	128	128

F = Unit Offline

E = Exceedance

I = Invalid

M = Maintenance

Report Generated: 02/07/18 09:16

C = Calibration

S = Substituted

T = Out Of Control

Average Data

Plant: HUNTINGTON PLANT

Interval: 1 Minute

Type: Block

Report Period: 02/07/2018 09:38 Through 02/07/2018 11:44

Time Online Criteria: 1 minute(s)

Source	UNIT2					
	Parameter (Unit)	BARPRESS (INHG)	CO2 (PCT)	OPACITY (PCT)	STKTEMP (DEGF)	UNITLOAD (MMW)
02/07/18 09:38		23.975	10.8	1.3	104.74	468
02/07/18 09:39		23.975	10.9	1.3	103.20	468
02/07/18 09:40		23.976	11.0	1.3	102.43	468
02/07/18 09:41		23.976	10.9	1.3	102.83	468
02/07/18 09:42		23.975	10.9	1.3	103.22	468
02/07/18 09:43		23.976	11.0	1.3	104.15	469
02/07/18 09:44		23.975	10.9	1.3	107.50	469
02/07/18 09:45		23.976	10.9	1.3	110.94	470
02/07/18 09:46		23.976	10.9	1.3	110.85	469
02/07/18 09:47		23.977	10.8	1.3	110.94	469
02/07/18 09:48		23.977	10.8	1.4	111.22	469
02/07/18 09:49		23.978	10.8	1.5	111.48	470
02/07/18 09:50		23.978	10.9	1.5	111.59	470
02/07/18 09:51		23.979	10.9	1.4	111.49	470
02/07/18 09:52		23.980	10.8	1.4	111.46	470
02/07/18 09:53		23.980	10.8	1.4	111.62	470
02/07/18 09:54		23.981	10.8	1.4	111.61	469
02/07/18 09:55		23.982	10.9	1.3	111.48	470
02/07/18 09:56		23.982	10.9	1.3	111.36	470
02/07/18 09:57		23.982	10.9	1.3	111.16	470
02/07/18 09:58		23.983	10.9	1.3	111.08	470
02/07/18 09:59		23.983	10.9	1.3	111.07	471
02/07/18 10:00		23.983	11.0	1.3	111.04	471
02/07/18 10:01		23.984	10.9	1.3	111.09	471
02/07/18 10:02		23.984	10.9	1.3	111.25	471
02/07/18 10:03		23.983	10.9	1.3	111.15	471
02/07/18 10:04		23.983	10.9	1.3	111.01	471
02/07/18 10:05		23.982	10.9	1.3	111.07	472
02/07/18 10:06		23.981	10.9	1.3	111.09	472
02/07/18 10:07		23.981	10.9	1.3	111.19	471
02/07/18 10:08		23.980	10.7	1.2	111.35	471
02/07/18 10:09		23.979	10.8	1.2	111.21	470
02/07/18 10:10		23.979	10.9	1.3	111.08	470
02/07/18 10:11		23.979	10.9	1.2	111.15	471
02/07/18 10:12		23.978	10.9	1.3	111.23	471
02/07/18 10:13		23.978	10.9	1.2	111.24	471
02/07/18 10:14		23.978	10.8	1.2	111.40	471
02/07/18 10:15		23.978	10.8	1.3	111.31	471
02/07/18 10:16		23.978	10.9	1.3	110.98	472
02/07/18 10:17	F = Unit Offline	23.978	10.9	1.3	110.93	473

E = Exceedance

I = Invalid

M = Maintenance

Report Generated 02/07/18 11:53
045AS-341317-PP-19

C = Calibration

S = Substituted

T = Out Of Control

Average Data

Plant: HUNTINGTON PLANT

Interval: 1 Minute

Type: Block

Report Period: 02/07/2018 09:38 Through 02/07/2018 11:44

Time Online Criteria: 1 minute(s)

02/07/18	10:18	23.978	10.9	1.3	110.86	473
02/07/18	10:19	23.978	11.0	1.3	110.90	473
02/07/18	10:20	23.978	10.9	1.3	111.07	471
02/07/18	10:21	23.978	10.7	1.3	111.08	469
02/07/18	10:22	23.978	10.7	1.3	111.13	467
02/07/18	10:23	23.978	10.8	1.3	111.11	467
02/07/18	10:24	23.979	10.9	1.4	111.06	468
02/07/18	10:25	23.980	10.9	1.3	110.87	469
02/07/18	10:26	23.980	11.0	1.4	110.79	470
02/07/18	10:27	23.980	11.0	1.4	110.90	472
02/07/18	10:28	23.980	11.0	1.4	110.62	473
02/07/18	10:29	23.979	11.0	1.4	106.95	473
02/07/18	10:30	23.978	11.0	1.4	104.28	475
02/07/18	10:31	23.978	11.2	1.4	102.98	476
02/07/18	10:32	23.978	11.2	1.4	102.92	476
02/07/18	10:33	23.978	11.1	1.4	104.12	474
02/07/18	10:34	23.978	10.9	1.3	104.69	474
02/07/18	10:35	23.978	11.0	1.4	103.92	473
02/07/18	10:36	23.978	11.0	1.3	103.04	472
02/07/18	10:37	23.978	10.9	1.4	102.86	470
02/07/18	10:38	23.978	10.8	1.4	102.74	468
02/07/18	10:39	23.979	10.8	1.3	102.44	467
02/07/18	10:40	23.979	10.9	1.3	102.91	467
02/07/18	10:41	23.979	10.9	1.3	103.77	468
02/07/18	10:42	23.980	11.0	1.4	108.78	469
02/07/18	10:43	23.980	11.1	1.3	110.29	470
02/07/18	10:44	23.980	11.0	1.3	110.23	472
02/07/18	10:45	23.980	11.0	1.3	110.01	474
02/07/18	10:46	23.980	11.1	1.3	110.10	475
02/07/18	10:47	23.980	11.0	1.3	110.57	475
02/07/18	10:48	23.981	10.8	1.2	111.10	473
02/07/18	10:49	23.981	10.9	1.2	111.20	471
02/07/18	10:50	23.982	10.8	1.2	111.27	469
02/07/18	10:51	23.982	10.8	1.2	111.39	468
02/07/18	10:52	23.982	10.8	1.2	111.32	467
02/07/18	10:53	23.982	10.8	1.3	111.05	467
02/07/18	10:54	23.982	10.9	1.3	110.96	467
02/07/18	10:55	23.982	10.9	1.3	111.08	468
02/07/18	10:56	23.982	11.0	1.3	111.09	469
02/07/18	10:57	23.983	11.0	1.3	111.06	471
02/07/18	10:58	23.983	11.0	1.3	110.89	473
02/07/18	10:59	23.984	11.0	1.3	110.66	474
02/07/18	11:00	23.984	11.1	1.3	110.82	474

F = Unit Offline

E = Exceedance

I = Invalid

M = Maintenance

C = Calibration

S = Substituted

T = Out Of Control

Average Data

Plant: HUNTINGTON PLANT

Interval: 1 Minute

Type: Block

Report Period: 02/07/2018 09:38 Through 02/07/2018 11:44

Time Online Criteria: 1 minute(s)

02/07/18	11:01	23.984	11.0	1.3	111.08	473
02/07/18	11:02	23.984	10.9	1.3	111.29	472
02/07/18	11:03	23.984	10.9	1.3	111.40	472
02/07/18	11:04	23.984	10.9	1.3	111.30	471
02/07/18	11:05	23.984	11.0	1.3	111.41	470
02/07/18	11:06	23.984	10.9	1.3	111.61	470
02/07/18	11:07	23.984	10.8	1.3	111.52	470
02/07/18	11:08	23.984	10.9	1.3	111.43	470
02/07/18	11:09	23.984	10.9	1.4	111.36	470
02/07/18	11:10	23.983	11.0	1.4	111.35	471
02/07/18	11:11	23.983	11.0	1.5	111.31	472
02/07/18	11:12	23.984	10.9	1.4	111.20	471
02/07/18	11:13	23.984	10.9	1.4	111.15	471
02/07/18	11:14	23.984	11.0	1.4	111.27	471
02/07/18	11:15	23.985	10.9	1.4	111.25	472
02/07/18	11:16	23.985	11.0	1.4	111.10	472
02/07/18	11:17	23.984	11.0	1.3	111.23	473
02/07/18	11:18	23.984	10.9	1.3	111.29	473
02/07/18	11:19	23.984	11.0	1.4	111.22	474
02/07/18	11:20	23.984	11.0	1.4	111.28	475
02/07/18	11:21	23.985	10.9	1.3	111.30	475
02/07/18	11:22	23.984	11.0	1.3	111.23	476
02/07/18	11:23	23.984	11.0	1.3	111.19	475
02/07/18	11:24	23.984	10.9	1.3	111.45	475
02/07/18	11:25	23.984	10.8	1.3	111.64	475
02/07/18	11:26	23.983	10.8	1.3	108.12	473
02/07/18	11:27	23.983	10.9	1.3	106.18	472
02/07/18	11:28	23.982	10.8	1.3	105.01	469
02/07/18	11:29	23.982	10.8	1.3	104.21	469
02/07/18	11:30	23.982	10.9	1.3	104.33	469
02/07/18	11:31	23.981	10.9	1.3	104.67	469
02/07/18	11:32	23.981	11.0	1.3	104.73	470
02/07/18	11:33	23.981	10.9	1.3	104.36	470
02/07/18	11:34	23.981	10.9	1.2	103.90	469
02/07/18	11:35	23.981	10.9	1.2	103.50	469
02/07/18	11:36	23.981	10.9	1.2	102.94	470
02/07/18	11:37	23.981	11.0	1.2	102.79	471
02/07/18	11:38	23.980	11.1	1.2	103.49	471
02/07/18	11:39	23.980	11.0	1.2	103.81	473
02/07/18	11:40	23.980	11.1	1.2	104.28	472
02/07/18	11:41	23.979	11.0	1.2	105.15	473
02/07/18	11:42	23.979	11.0	1.2	109.25	473
02/07/18	11:43	23.979	11.0	1.3	110.67	473

F = Unit Offline

E = Exceedance

I = Invalid

M = Maintenance

C = Calibration

S = Substituted

T = Out Of Control

Average Data

Plant: HUNTINGTON PLANT

Interval: 1 Minute

Type: Block

Report Period: 02/07/2018 09:38 Through 02/07/2018 11:44

Time Online Criteria: 1 minute(s)

02/07/18	11:44	23.979	10.9	1.2	110.80	473
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Average	23.981	10.9	1.3	109.10	471
Minimum	23.975	10.7	1.2	102.43	467
Maximum	23.985	11.2	1.5	111.64	476
Summation	3,045.539	1,386.8	166.4	13,855.12	59,814
Included Data Points	127	127	127	127	127
Total number of Data Points	127	127	127	127	127

F = Unit Offline

E = Exceedance

I = Invalid

M = Maintenance

Report Generated 02/07/18 11:53
Report ID: 045AS-341317-PP-19

C = Calibration

S = Substituted

T = Out Of Control

Average Data

Plant: HUNTINGTON PLANT

Interval: 1 Minute

Type: Block

Report Period: 02/07/2018 12:43 Through 02/07/2018 14:53

Time Online Criteria: 1 minute(s)

Source	Parameter (Unit)	UNIT2				
		BARPRESS (INHG)	CO2 (PCT)	OPACITY (PCT)	STKTEMP (DEGF)	UNITLOAD (MMW)
02/07/18	12:43	23.961	10.9	1.4	111.57	475
02/07/18	12:44	23.961	10.8	1.4	111.54	474
02/07/18	12:45	23.960	10.8	1.4	111.48	472
02/07/18	12:46	23.960	10.9	1.4	111.56	471
02/07/18	12:47	23.959	10.8	1.4	111.39	470
02/07/18	12:48	23.960	10.9	1.3	111.17	469
02/07/18	12:49	23.959	10.9	1.3	111.10	469
02/07/18	12:50	23.959	10.9	1.4	111.06	470
02/07/18	12:51	23.959	11.0	1.4	111.07	471
02/07/18	12:52	23.958	11.0	1.3	111.04	473
02/07/18	12:53	23.957	11.0	1.4	110.89	473
02/07/18	12:54	23.956	11.0	1.3	110.94	474
02/07/18	12:55	23.956	11.0	1.3	110.89	475
02/07/18	12:56	23.955	11.1	1.3	110.77	475
02/07/18	12:57	23.954	11.0	1.3	110.94	475
02/07/18	12:58	23.954	10.9	1.3	111.24	473
02/07/18	12:59	23.953	10.9	1.3	111.38	471
02/07/18	13:00	23.952	10.9	1.3	111.42	470
02/07/18	13:01	23.951	10.9	1.3	111.45	469
02/07/18	13:02	23.950	10.9	1.3	111.35	468
02/07/18	13:03	23.949	10.8	1.3	111.25	468
02/07/18	13:04	23.949	10.9	1.3	110.98	469
02/07/18	13:05	23.950	11.0	1.3	110.96	469
02/07/18	13:06	23.950	10.9	1.3	111.10	471
02/07/18	13:07	23.950	11.0	1.3	111.08	473
02/07/18	13:08	23.949	11.1	1.3	111.12	474
02/07/18	13:09	23.949	11.0	1.3	111.31	475
02/07/18	13:10	23.949	11.0	1.3	111.47	476
02/07/18	13:11	23.948	11.1	1.3	111.51	477
02/07/18	13:12	23.947	10.9	1.3	111.69	476
02/07/18	13:13	23.947	10.8	1.3	111.72	475
02/07/18	13:14	23.947	10.9	1.3	111.72	474
02/07/18	13:15	23.946	10.8	1.3	111.92	472
02/07/18	13:16	23.946	10.8	1.3	111.91	471
02/07/18	13:17	23.946	10.8	1.3	111.89	470
02/07/18	13:18	23.945	10.8	1.3	111.77	470
02/07/18	13:19	23.945	10.8	1.4	111.79	470
02/07/18	13:20	23.944	10.8	1.4	111.60	469
02/07/18	13:21	23.944	10.8	1.4	110.52	469
02/07/18	13:22	23.944	10.9	1.4	107.42	469

F = Unit Offline

E = Exceedance

I = Invalid

M = Maintenance

C = Calibration

S = Substituted

T = Out Of Control

Average Data

Plant: HUNTINGTON PLANT

Interval: 1 Minute

Type: Block

Report Period: 02/07/2018 12:43 Through 02/07/2018 14:53

Time Online Criteria: 1 minute(s)

02/07/18	13:23	23.944	10.9	1.4	105.72	469
02/07/18	13:24	23.943	10.8	1.4	104.97	469
02/07/18	13:25	23.942	11.0	1.4	104.69	470
02/07/18	13:26	23.942	11.1	1.3	104.83	471
02/07/18	13:27	23.941	11.1	1.3	104.99	472
02/07/18	13:28	23.941	11.0	1.3	104.80	473
02/07/18	13:29	23.940	11.0	1.3	103.51	473
02/07/18	13:30	23.940	11.1	1.3	102.78	473
02/07/18	13:31	23.940	11.1	1.3	103.25	473
02/07/18	13:32	23.940	11.0	1.3	103.91	472
02/07/18	13:33	23.940	11.0	1.3	104.79	472
02/07/18	13:34	23.940	11.0	1.3	107.15	472
02/07/18	13:35	23.940	11.0	1.2	111.55	471
02/07/18	13:36	23.939	10.8	1.2	111.75	470
02/07/18	13:37	23.939	10.7	1.2	111.67	470
02/07/18	13:38	23.937	10.8	1.2	111.46	470
02/07/18	13:39	23.937	10.9	1.2	111.56	470
02/07/18	13:40	23.937	10.8	1.2	111.83	470
02/07/18	13:41	23.937	10.7	1.2	111.73	471
02/07/18	13:42	23.937	10.9	1.2	111.58	472
02/07/18	13:43	23.936	10.9	1.2	111.72	472
02/07/18	13:44	23.935	10.9	1.2	111.81	472
02/07/18	13:45	23.935	10.8	1.2	111.81	471
02/07/18	13:46	23.934	10.8	1.2	111.68	472
02/07/18	13:47	23.935	10.9	1.2	111.64	472
02/07/18	13:48	23.935	10.9	1.2	111.79	472
02/07/18	13:49	23.935	10.9	1.2	111.84	472
02/07/18	13:50	23.935	10.8	1.2	111.98	471
02/07/18	13:51	23.935	10.8	1.2	111.96	471
02/07/18	13:52	23.935	10.9	1.2	111.84	471
02/07/18	13:53	23.935	10.8	1.2	111.94	470
02/07/18	13:54	23.935	10.7	1.2	111.88	470
02/07/18	13:55	23.935	10.8	1.2	111.84	469
02/07/18	13:56	23.936	10.7	1.2	111.95	468
02/07/18	13:57	23.936	10.7	1.3	112.00	468
02/07/18	13:58	23.936	10.8	1.3	112.09	468
02/07/18	13:59	23.935	10.8	1.3	112.09	468
02/07/18	14:00	23.935	10.8	1.3	112.12	468
02/07/18	14:01	23.935	10.8	1.4	111.95	469
02/07/18	14:02	23.935	10.9	1.4	111.60	470
02/07/18	14:03	23.934	10.9	1.4	111.71	471
02/07/18	14:04	23.934	10.9	1.3	111.75	472
02/07/18	14:05	23.934	11.0	1.3	111.73	473

F = Unit Offline

E = Exceedance

I = Invalid

M = Maintenance

C = Calibration

S = Substituted

T = Out Of Control

Average Data

Plant: HUNTINGTON PLANT

Interval: 1 Minute

Type: Block

Report Period: 02/07/2018 12:43 Through 02/07/2018 14:53

Time Online Criteria: 1 minute(s)

02/07/18	14:06	23.935	10.9	1.3	111.90	474
02/07/18	14:07	23.935	10.9	1.3	111.87	473
02/07/18	14:08	23.935	10.9	1.3	112.03	472
02/07/18	14:09	23.936	10.8	1.3	112.31	471
02/07/18	14:10	23.936	10.7	1.3	112.28	469
02/07/18	14:11	23.935	10.7	1.3	112.12	469
02/07/18	14:12	23.935	10.7	1.3	111.94	468
02/07/18	14:13	23.934	10.9	1.3	111.92	468
02/07/18	14:14	23.934	10.8	1.3	111.88	469
02/07/18	14:15	23.935	10.9	1.3	111.81	471
02/07/18	14:16	23.935	11.0	1.3	111.71	474
02/07/18	14:17	23.935	11.0	1.3	111.68	476
02/07/18	14:18	23.935	11.0	1.2	111.10	476
02/07/18	14:19	23.935	10.9	1.2	109.13	476
02/07/18	14:20	23.934	10.8	1.2	106.95	475
02/07/18	14:21	23.933	10.9	1.2	106.17	472
02/07/18	14:22	23.933	10.8	1.2	106.51	470
02/07/18	14:23	23.933	10.7	1.2	107.13	468
02/07/18	14:24	23.933	10.7	1.2	107.24	467
02/07/18	14:25	23.933	10.7	1.2	106.65	466
02/07/18	14:26	23.933	10.9	1.2	105.59	467
02/07/18	14:27	23.933	11.0	1.3	104.56	468
02/07/18	14:28	23.933	11.0	1.3	103.95	470
02/07/18	14:29	23.933	11.0	1.3	104.28	472
02/07/18	14:30	23.933	11.0	1.3	104.68	474
02/07/18	14:31	23.933	11.2	1.3	105.75	477
02/07/18	14:32	23.933	11.1	1.3	111.08	477
02/07/18	14:33	23.932	10.9	1.3	111.66	477
02/07/18	14:34	23.933	10.8	1.3	111.73	475
02/07/18	14:35	23.932	10.7	1.3	112.35	471
02/07/18	14:36	23.932	10.5	1.3	112.51	469
02/07/18	14:37	23.933	10.6	1.3	112.37	467
02/07/18	14:38	23.932	10.6	1.3	112.37	467
02/07/18	14:39	23.932	10.6	1.3	112.29	466
02/07/18	14:40	23.932	10.7	1.4	112.19	467
02/07/18	14:41	23.933	10.8	1.4	112.07	468
02/07/18	14:42	23.933	10.8	1.3	111.89	471
02/07/18	14:43	23.933	10.9	1.4	111.73	474
02/07/18	14:44	23.933	10.9	1.3	111.64	476
02/07/18	14:45	23.933	11.0	1.3	111.70	477
02/07/18	14:46	23.933	10.9	1.3	111.87	476
02/07/18	14:47	23.933	10.8	1.3	112.25	475
02/07/18	14:48	23.934	10.7	1.3	112.49	474

F = Unit Offline

E = Exceedance

I = Invalid

M = Maintenance

C = Calibration

S = Substituted

T = Out Of Control

Average Data

Plant: HUNTINGTON PLANT

Interval: 1 Minute

Type: Block

Report Period: 02/07/2018 12:43 Through 02/07/2018 14:53

Time Online Criteria: 1 minute(s)

02/07/18	14:49	23.934	10.7	1.3	112.52	471
02/07/18	14:50	23.934	10.6	1.3	112.47	470
02/07/18	14:51	23.935	10.7	1.3	112.23	469
02/07/18	14:52	23.935	10.7	1.3	112.20	468
02/07/18	14:53	23.934	10.7	1.3	112.36	467

Average	23.940	10.9	1.3	110.45	471
Minimum	23.932	10.5	1.2	102.78	466
Maximum	23.961	11.2	1.4	112.52	477
Summation	3,136.194	1,423.8	169.3	14,469.33	61,741
Included Data Points	131	131	131	131	131
Total number of Data Points	131	131	131	131	131

F = Unit Offline

E = Exceedance

I = Invalid

M = Maintenance

Report Generated 02/07/18 15:34

C = Calibration

S = Substituted

T = Out Of Control



Appendix E: Calibration Information

Dry Gas Meter Pre-Test and Post-Test Calibrations
Critical Orifice Calibration Certificate



METHOD 5 CRITICAL ORIFICE SET CALIBRATION

ORIFICE SET	40-73
ORIFICE SERIES	IS
METER GAMMA	0.9951

*

CALIBRATION CONDITIONS					
DATE STARTED	08/01/17				
DATE FINISHED	08/01/17				
CALIBRATION TECH	RS				

CALIBRATION DATA

Date	Orifice Number	Barometric Pressure	Theoretical Critical Vacuum	Elapsed Time	DGM dH	Volume Initial	Volume Final	Volume Total	Standardized Volume	Outlet Temp	Temp t_{out}	Temp t_{amb}	Ambient Vacuum	Actual Vacuum	REFERENCE METER			CRITICAL ORIFICE		
															K _c	Coefficient Metric	Coefficient English	% Variation From Average	Standard Flow Q	
08/01/17	40	734	355.9	0.0	mm Hg	min	mm H2O	m3	m3	°C	°C	°C	mmHg	see below*	<0.5%	%	L·pm			
08/01/17	40	734	355.9	10	0.0	25.61618	25.5506	0.0888	0.0839	26.7	26.7	25.0	25.6	1.9650E-04	1.9640E-04	0.05	8.35			
08/01/17	40	734	355.9	10	0.0	25.9506	26.0393	0.0887	0.0838	26.7	26.7	25.6	25.6	0.2363	0.2361	0.00	8.34			
08/01/17	48	734	355.9	10	0.0	26.1280	0.0887	0.0837	26.7	26.7	25.6	25.6	1.9627E-04	1.9627E-04	-0.06	8.34				
08/01/17	48	734	355.9	10	0.0	25.4540	25.5944	0.1305	0.1231	27.2	26.7	25.6	25.6	2.6839E-04	2.6839E-04	0.3470	-0.08	12.25		
08/01/17	48	734	355.9	10	0.0	25.9844	25.7150	0.1305	0.1233	26.7	26.7	25.6	25.6	2.8820E-04	2.8820E-04	0.3476	0.08	12.27		
08/01/17	48	734	355.9	10	0.0	25.7150	25.9455	0.1305	0.1232	26.7	26.7	25.6	25.6	2.8864E-04	2.8864E-04	0.3473	-0.01	12.26		
08/01/17	55	734	355.9	10	0.0	24.8792	25.0520	0.1728	0.1529	27.2	27.2	25.0	25.0	22.87312	22.87312	551.0				
08/01/17	55	734	355.9	10	0.0	25.0520	25.0251	0.1732	0.1532	27.2	27.2	25.0	25.0	2.8844E-04	2.8844E-04	0.3470	-0.08	12.25		
08/01/17	55	734	355.9	10	0.0	25.2251	25.3980	0.1729	0.1630	27.2	27.2	25.0	25.0	22.87312	22.87312	551.0				
08/01/17	55	734	355.9	10	0.0	24.8106	24.9835	0.1729	0.1630	27.2	27.2	25.0	25.0	2.8820E-04	2.8820E-04	0.3476	0.08	12.27		
08/01/17	63	734	355.9	10	0.0	24.1911	24.4134	0.2223	0.2100	26.7	26.7	25.0	25.0	21.81016	21.81016	554.0				
08/01/17	63	734	355.9	10	0.0	24.4134	24.6359	0.2225	0.2099	26.7	26.7	25.0	25.0	3.8214E-04	3.8214E-04	0.4598	0.10	16.25		
08/01/17	63	734	355.9	10	0.0	24.6359	24.8595	0.2226	0.2098	27.2	27.2	25.0	25.0	21.81016	21.81016	554.0				
08/01/17	63	734	355.9	10	0.0	24.2474	24.4539	0.2225	0.2099	26.7	26.7	25.0	25.0	3.8177E-04	3.8177E-04	0.4593	0.00	16.23		
08/01/17	73	734	355.9	10	0.0	23.2764	23.5701	0.2936	0.2786	25.6	25.6	25.0	25.0	20.5037	20.5037	552.0				
08/01/17	73	734	355.9	10	0.0	23.5701	23.6647	0.2946	0.2790	25.6	26.1	25.0	25.0	4.9160E-04	4.9160E-04	0.5915	0.03	20.90		
08/01/17	73	734	355.9	10	0.0	23.8647	24.1591	0.2944	0.2782	26.1	26.7	25.0	25.0	4.9152E-04	4.9152E-04	0.5914	0.02	20.90		
08/01/17	73	734	355.9	10	0.0	23.2764	23.5701	0.2936	0.2786	25.6	25.6	25.0	25.0	4.9119E-04	4.9119E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.5701	23.6647	0.2946	0.2790	25.6	26.1	25.0	25.0	4.9144E-04	4.9144E-04	0.5913				
08/01/17	73	734	355.9	10	0.0	23.8647	24.1591	0.2944	0.2782	26.1	26.7	25.0	25.0	4.9227E-04	4.9227E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.2764	23.5701	0.2936	0.2786	25.6	25.6	25.0	25.0	4.9248E-04	4.9248E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.5701	23.6647	0.2946	0.2790	25.6	26.1	25.0	25.0	4.9236E-04	4.9236E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.8647	24.1591	0.2944	0.2782	26.1	26.7	25.0	25.0	4.9142E-04	4.9142E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.2764	23.5701	0.2936	0.2786	25.6	25.6	25.0	25.0	4.9119E-04	4.9119E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.5701	23.6647	0.2946	0.2790	25.6	26.1	25.0	25.0	4.9144E-04	4.9144E-04	0.5913				
08/01/17	73	734	355.9	10	0.0	23.8647	24.1591	0.2944	0.2782	26.1	26.7	25.0	25.0	4.9227E-04	4.9227E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.2764	23.5701	0.2936	0.2786	25.6	25.6	25.0	25.0	4.9248E-04	4.9248E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.5701	23.6647	0.2946	0.2790	25.6	26.1	25.0	25.0	4.9236E-04	4.9236E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.8647	24.1591	0.2944	0.2782	26.1	26.7	25.0	25.0	4.9142E-04	4.9142E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.2764	23.5701	0.2936	0.2786	25.6	25.6	25.0	25.0	4.9119E-04	4.9119E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.5701	23.6647	0.2946	0.2790	25.6	26.1	25.0	25.0	4.9144E-04	4.9144E-04	0.5913				
08/01/17	73	734	355.9	10	0.0	23.8647	24.1591	0.2944	0.2782	26.1	26.7	25.0	25.0	4.9227E-04	4.9227E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.2764	23.5701	0.2936	0.2786	25.6	25.6	25.0	25.0	4.9248E-04	4.9248E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.5701	23.6647	0.2946	0.2790	25.6	26.1	25.0	25.0	4.9236E-04	4.9236E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.8647	24.1591	0.2944	0.2782	26.1	26.7	25.0	25.0	4.9142E-04	4.9142E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.2764	23.5701	0.2936	0.2786	25.6	25.6	25.0	25.0	4.9119E-04	4.9119E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.5701	23.6647	0.2946	0.2790	25.6	26.1	25.0	25.0	4.9144E-04	4.9144E-04	0.5913				
08/01/17	73	734	355.9	10	0.0	23.8647	24.1591	0.2944	0.2782	26.1	26.7	25.0	25.0	4.9227E-04	4.9227E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.2764	23.5701	0.2936	0.2786	25.6	25.6	25.0	25.0	4.9248E-04	4.9248E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.5701	23.6647	0.2946	0.2790	25.6	26.1	25.0	25.0	4.9236E-04	4.9236E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.8647	24.1591	0.2944	0.2782	26.1	26.7	25.0	25.0	4.9142E-04	4.9142E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.2764	23.5701	0.2936	0.2786	25.6	25.6	25.0	25.0	4.9119E-04	4.9119E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.5701	23.6647	0.2946	0.2790	25.6	26.1	25.0	25.0	4.9144E-04	4.9144E-04	0.5913				
08/01/17	73	734	355.9	10	0.0	23.8647	24.1591	0.2944	0.2782	26.1	26.7	25.0	25.0	4.9227E-04	4.9227E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.2764	23.5701	0.2936	0.2786	25.6	25.6	25.0	25.0	4.9248E-04	4.9248E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.5701	23.6647	0.2946	0.2790	25.6	26.1	25.0	25.0	4.9236E-04	4.9236E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.8647	24.1591	0.2944	0.2782	26.1	26.7	25.0	25.0	4.9142E-04	4.9142E-04	0.5910	-0.05	20.89		
08/01/17	73	734	355.9	10	0.0	23.2764	23.5701	0.2936	0.2786	25.6	25.6	25.0	25.0	4.9119E-04	4.9119E-04	0.5910	-0.05	20.89		
08/01/17</td																				

RF-DGM-CXO

**APEX INSTRUMENTS REFERENCE METER 2 Point Audit
USING WET-TEST METER #11AE6**

Air Compliance Testing

Calibration Meter Information

WTM Model #	AL20
WTM Serial #	11AE6
WTM Gamma	0.9999
Original 16Pt Gamma	0.9951

Calibration Conditions

Calibration Conditions		
Date	Time	12-Jan-17
Barometric Pressure	29.85	In Hg
Calibration Tech	EW	
DGM Serial Number	S-110-1512377	

Calibration Data

Run Time	Measuring Container	Calibration Meter						Variation	Results
		DGM Input Pressure	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final	Volume Sample	Calibration Meter	
Elapsed (G) min	(V _{in}) cubic feet	(P _{in}) in H ₂ O	(V _{in}) cubic feet	(V _{out}) cubic feet	(T _{in}) °F	(T _{out}) °F	(V _m) cubic feet	(V _m) cubic feet	Dry Gas Meter
6.00	-3.9	435.192	441.194	6.002	73.4	73.4	672.645	678.575	Calibration Factor
							70	70	Previous (Y)
									Current (Y)
									P _{calib} in H ₂ O
									°F
									in H ₂ O
									0.9985
									0.9927
									0.99%
									must be less than
									0.59%
									0.8977
									0.9953
									0.89%
									must be less than
									0.24%
									0.24%
									must be less than

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR 40 Part 80, App A, Method 6, Paragraph 7.1.2, using the Precision Wet Test Meter # 11AE6, which in turn was calibrated using the American Bell Prover # 3785, certificate # F-107, which is traceable to the National Bureau of Standards (N.I.S.T.).

Signature: *Chris White*

Date: 1/12/17

RF - DGM1 - 004

**APEX INSTRUMENTS REFERENCE METER CALIBRATION
USING WET-TEST METER #11AE6**

Calibration Meter Information	
WTM Model #	AL-20
WTM Serial #	11AEG
WTM Genome	0.9899

CERTIFICATION ENGLISH UNITS			
Calibration Conditions			
Date	Time	7-Feb-14	12:00
Barometric Pressure	29.9		in Hg
Calibration Technician	EW		
Data Serial Number	S-120-1512377		

Run Time	Dry Gas Meter						Calibration Data
	Meter Elapsed (h)	Pressure $\text{[P}_\text{a}\text{]}$ in H ₂ O	Volume Initial (V_in)	Volume Final (V_out)	Sample Volume (V_s)	Outlet Temp in °Hai	
5	-5.0	298.288	212.428	6.140	73.4	73.4	
5	-5.0	212.428	216.594	6.166	73.4	73.4	
5	-5.0	212.504	216.594	6.166	73.4	73.4	

		Passive Calibration	Fair	Averages	1.20
6	-3.8	243.957	nan	...	
6	-3.8	243.957	nan	...	
6	-3.8	243.957	nan	...	
6	-3.8	243.957	nan	...	

	Passed	Calibration	F_B	0.9827	A_{overhead}	0.98
	0.9825			-0.0004		

Passed Calibration F8 0.9924 Averages 0.78

Passed	Calibration Fa	0.9993	Averages	0.55
1-E	1-E			
1-F	1-F			
1-G	1-G			
1-H	1-H			
1-I	1-I			
1-J	1-J			
1-K	1-K			
1-L	1-L			
1-M	1-M			
1-N	1-N			
1-O	1-O			
1-P	1-P			
1-Q	1-Q			
1-R	1-R			
1-S	1-S			
1-T	1-T			
1-U	1-U			
1-V	1-V			
1-W	1-W			
1-X	1-X			
1-Y	1-Y			
1-Z	1-Z			

Decrease in the amount of the loan -

Note: For Calibration Factor Y , the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual meters.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR 40 Part B6, using the Precision Wet Test Meter # 11AE, which in turn was calibrated using the American Bell Prover # 3785, certificate # F107, which is traceable to the National Bureau of Standards.

3.



American Association for Laboratory Accreditation

Accredited Air Emission Testing Body

A2LA has accredited

MONROSE AIR QUALITY SERVICES

In recognition of the successful completion of the joint A2LA and Stack Testing Accreditation Council (STAC) evaluation process, this organization is accredited to perform testing activities in compliance with
ASTM D7036 - Standard Practice for Competence of Air Emission Testing Bodies.

Presented this 2nd day of February 2016

Senior Director of Quality and Communications
Certificate Number 3925.01
Valid to February 28, 2018



This accreditation program is not included under the A2LA ILAC Mutual Recognition Arrangement.